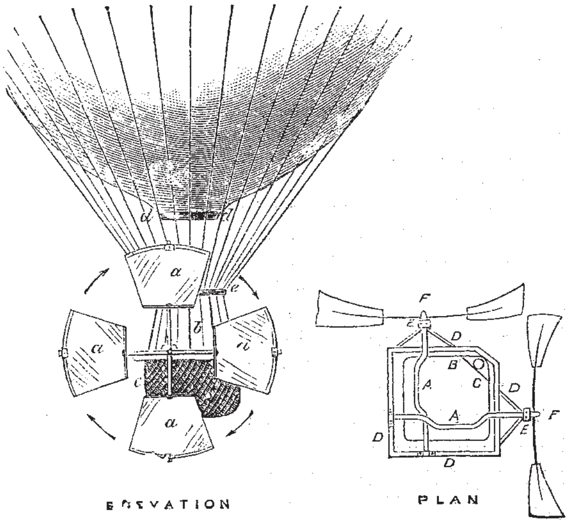
reigning current was a strong S.W. wind, which was unfavourable for escaping the Prussian lines, as the intended directing power was only a motion of three feet per second. The experiment should have been postponed for a fair trial. Another drawback to the Expedition was the despatch of the balloon in the night-time, although the moon, being almost full at the time, afforded some light to the aërial travellers, being very low on the horizon when "Le Duquesne" left the Orleans railway station. There were in the car M. Richard and three sailors of the national navy, so that two could be kept pulling without interruption; three sacks of despatches, four pigeons, eight sacks of ballast, thirty kilogrammes each, were also in the car. The provisions were bread, wine, and chocolate. The weight of the machinery was 300 pounds. As will be seen by the accompanying diagram, the two screws were worked by a very simple contrivance, rotating only at a rate of twenty-five rotations per minute, but the diameter four yards, so that the motion in feet per second of the screws was about sixteen, five or six times more than the rapidity intended to be given to the balloon, which was three miles an hour.

Before leaving ground the car had been placed with its diagonal due north. But that precaution proved useless, as the balloon rotated when ascending before the screws could be put into operation.

We will give the explanation under M. Richard's own authority, with some remarks. We are certain of his perfect truthfulness, but it is very hard to say if he saw everything correctly for the whole length of the eventful journey.



ELEVATION PLAN

THE DUQUESNE DIRECTING BALLOON, DESPATCHED FROM PARIS JANUARY 9, 1871

a a a a segments of the screw revolving in the direction of the arrow or the opposite direction, with variable rapidity; *b* valve line; *c* car; *d* appendage *e* hoop.

A A handle for moving screw, two men pulling at once; C place of the captain; B place of one man; D D board in iron tubes fixed to the car; E E extremities of the axes; F F fixing screw, which can be removed so that wheels may be thrown overboard when landing.

The observers on the ground had placed themselves in a right position to ascertain the effect of the screws, and the *compte-rendu* published in Paris gave the summary of their impressions. They suppose M. Richard succeeded in giving to his balloon a deviation of 15° from the due course of the wind during the earlier part of his journey. If experiments had been made during daylight, matters should have been more easy to ascertain. If I can procure authorisation, I will get an experiment tried anew at the Crystal Palace before an English audience. The fact is that two of the three sailors pulled with all their strength during a few minutes, after having exhibited some hesitation in the first instance. The scenery was so magnificent that it was necessary to call them twice before they began to pull.

M. Richard soon perceived that he was unable to ascertain the effect of the propeller. He resolved upon letting the balloon follow its way undisturbed, and he noted carefully the barometric altitude and the direction. When passing over Prussian lines at an altitude of $0^{\mathrm{mm}}\cdot69$, some shots were directed at the balloon without any result.

At $3^{\mathrm{h}}\ 10^{\mathrm{m}}$ altitude 0·68° was reached; temperature 20° F. The Valley of the Marne was below.

M. Richard turned the screws and tried to pull towards the north, in order to go N.N.E; but the rotation was difficult to stop. It was necessary to work only one screw during a long time in order to rotate the aërostat in the right direction. It was only when some real torsion was established between aërostat and car that the required revolution took place. But when movement was given to the balloon it was difficult to prevent it, and the aërostat executed one entire revolution against the will of its captain. Then the two screws were worked together; the same effects were produced, but it was only with great difficulty that the car was placed in the right direction. When the two screws were worked together, the balloon was rotating sometimes in one way and sometimes in another. These observations, moreover, says M. Richard, were made at night by a man who had never before ascended in a balloon. As already said they cannot be considered as wholly reliable, as rotation depends on the changing of the fuel as well as on the friction in the forward half or on inequality in the pulling of the screws. But it is very easy to understand that the fact of the screws being able to rotate the balloon in a given direction is unquestionable, although men and captain were equally unable to move it in the right direction for escaping Prussian lines.

The difficulties experienced were so great that M. Richard stopped the experiment, and tried it again only after day-break, but with no other success than previously.

At 7 o'clock in the morning, altitude 65 centimetres, temperature 11° Fahr., cirrus was visible at a great height, cumulus down below, and stratus covering the earth.

At 11 o'clock only one sack of ballast was left. The balloon stopped its descent; voices of peasantry were heard from above the stratus. They cry "Versy; commune of Chigny." The balloon emerging in stratus, fell rapidly by condensation. All the ballast was thrown away, and the balloon ran horizontally for two miles. The guide rope only had been thrown; then the grapnel was thrown out. The wind was so strong that the grapnel rope was broken. The screws and wheels had been thrown overboard, but the car incliners and the screw axes project outside. One of these comes into contact with the ground, the car is upset, and the crew are dragged under it for a length of time, 600 yards. The balloon is stopped by the loss of gas and the peasantry. The three sailors are slightly injured, the captain is left for dead. The sailors, helped by the peasantry, make their escape, and conceal balloon, car, and despatches in the woods. The captain is brought like a corpse into a neighbouring town, but is found to be alive. He is cured, and sent secretly into Lille, where the balloon arrived two days later.

W. DE FONVIELLE

NOTES

AT a recent meeting of the American Philosophical Society it was resolved "That a committee, consisting of the President of the Society and five members, be appointed, whose duties it shall be to consider and report whether it is desirable, and if desirable, whether it be practicable, to establish in the City of Philadelphia, under the auspices of the Society, an Observatory, astronomical and physical, either or both; and if so at what cost, on what site, and what instruments are requisite for such purposes, and at what cost such instruments can be procured." We suppose such a proposal for England would be looked upon as a joke, and yet already we cannot compare with America in our observing power.

WE are informed that the Royal Commission on Scientific Instruction and the Advancement of Science have their First Report nearly ready.

DR. J. CLERK MAXWELL, F.R.S., was elected yesterday to the Professorship of Experimental Physics in the University of Cambridge.

It will have been observed that Sir F. Goldsmid carried his motion in the House of Commons last week : "That, in the opinion of this House, young men qualified by character and attainments for admission into the service of the Government of India as civil engineers, ought not to be excluded from such service by reason of their not having been educated at a Government College." If the facilities afforded by existing institutions are not found sufficient for the training of practical engineers, it is quite right that the Government should step in and supply the deficiency ; our recent article on the subject shows whether the Institute of Civil Engineers is alive to the wants of the time in this respect. And if the Government establishes such a College, it is quite right that it should examine all candidates who present themselves, and give diplomas to those who pass them with credit ; otherwise, it shows but little faith in its own system of education. Mr. Lowe has well pointed out that the Government will place itself altogether in a false position if it abandons its intention with reference to the proposed College, and yet takes no notice of the want of adequate instruction in the existing institutions. A leading article in the *Engineer* of last week on the subject points out that the idea of a competition between the Royal Engineers and the proposed College is a bugbear.

The number of candidates for admission to the Royal Society this year is fifty.

The members of the French Institute have learned with deep regret the death of one of its most celebrated members. M. Lartet died in the department of the Gers during the investment of Paris. It is in that very department that he discovered an immense quantity of fossils at Saint Salut. M. Lartet was professor of Palæontology at the Museum of Natural History, filling the place of the lamented d'Archiac. He was ill from the time of his nomination, and was unable to deliver a single lecture except his inaugural address. M. Lartet is known to the whole scientific world by an immense quantity of academic and scientific memoirs. His only work of consequence was published in connection with Mr. Henry Christy, an English merchant well known for his love of geology. That publication, which marks a starting point in palæontological inquiries, is called *Reliquiæ Aquitanicæ*, and cost the late Mr. Christy an immense sum of money.

We are very glad to observe that a fund is being raised in this country for the relief of French horticulturists and gardeners who have suffered by the recent war. Many of them have been reduced to a deplorable plight, their gardens, greenhouses, and orchards having been completely destroyed. Their condition presents a strong claim on their more fortunate *confrères* in this country. Contributions may be made in money, plants, cuttings, grafts, stocks, seeds, tools, mats, &c., and it is urgently requested that subscriptions in money be forwarded at once to the treasurer, Mr. G. F. Wilson, F.R.S., Heatherbank, Weybridge Heath, or to the honorary secretary, Rev. H. H. Dombrain, Westwell Vicarage, Ashford, Kent.

The impulse given to the study of Natural Science at Rugby is already bearing fruit. Mr. R. J. Williamson, who was elected to a Natural Science Studentship at Christ Church, Oxford, on the 4th, and Mr. C. J. Taylor, who obtained Miss Burdett Coutts's Geological Scholarship on the third of this month, were both Rugbeians. Including these, Rugby has had six Natural Science Honours during the last twelve months, viz., two Oxford "Firsts," one Cambridge "First," two Christ Church Studentships, and the Geological Scholarship. All this is encouraging for the future.

The *Bookseller* records the death at Dartford, at the age of eighty-two, of Mr. Augustus Applegarth, the eminent mechanist and inventor, to whom the world at large and the printing trade in particular are largely indebted for his improvements in the printing-press. Until substituted by Hoe's American machine, the *Times* was printed from an Applegarth, which printed from 8,000 to 10,000 copies per hour. Mr. Applegarth took out no fewer than eighteen patents for various purposes, including three for the printing of bank-notes, and for printing silk ; but, like many inventors, although he enriched others, he failed to secure a fortune for himself.

M. Sorrel, one of the youngest members of the Observatory, has been a victim of the privations endured during the investment of Paris. He was engaged in the artillery of the National Guard. He had made one ascent on board the "Géant" and another on board the "Pole nord."

The cattle plague is raging amongst the herds which were congregated for the revictualling of Paris, and the carcases of dead animals are every day brought out in open carts, and conducted to Monfauçon to be buried. It appears that the same plague followed the invasion of 1814. M. Bouley, a member of the French Institute, contended in its last sitting that the meat of those animals could be eaten with impunity, and he said in support of his argument that cases of plague were discovered during the investment of Paris, and that the animals were not thrown away as useless. But it must not be forgotten that the mortality during the siege was very high, and that a part of the deaths may possibly be attributed to the bad quality of the meat taken from infected animals.

The weather at Paris is now very mild, and some fears are expressed of an outbreak of epidemic, in consequence of the burial of so many dead bodies of men and horses round Paris. It is supposed that 200,000 men and more than 100,000 horses were killed, besides 60,000 persons who died from different affections.

One of the most interesting scientific novelties of the day is the discovery of a true bone cave near Phœnixville, Pennsylvania, by Mr. C. M. Wheatley, reported in *Harper's Weekly*. The remains of animals, all extinct, are quite abundant and varied, and include bones of mastodon, horse, mylodon, and other forms, and are in great part entirely new to science. A preliminary report upon them, by Prof. Cope, was to appear in the March number of the *American Journal of Science*.

The same journal refers to the explorations made during the past summer in the western territories of the United States by the parties of Prof. Hayden and Prof. Marsh, the latter of whom has just published an interesting *résumé* of his geological observations. The principal field of his labours, as already stated, was the neighbourhood of Fort Bridger, among certain freshwater deposits from an ancient lake, the strata of which formed a thickness in places of at least 1,500 feet. Vertebrate remains of great variety were found entombed in these deposits, differing in marked features from those belonging to the Miocene basin east of the Rocky Mountains. In the latter bones of ruminating animals were especially abundant, while fishes and reptiles, with the exception of a single species of tortoise, were entirely wanting. In the Fort Bridger basin, on the other hand, reptilian life was in great development, and was represented by crocodiles, tortoises, lizards, and serpents, together with numerous fish, while many mammals, allied to the tapirs, as well as other small quadrupeds, occupied its borders. A detailed report of this exploration will be found in the March number of the *American Journal of Science*.

Lieutenant Payer, well known for his geological investigations in the Alps, has lately communicated some facts in regard to discoveries in Greenland by the late German expedition, of which he was a member ; and in this he calls attention especially to the probability of the hypothesis that Greenland is essentially a congeries of islands similar to that west of it, and not a huge continental mass, as has been supposed by most authors. One strong evidence of this he considers to be furnished by the deep inlet discovered by the expedition, previously unrecorded on any chart, and which received the name of Emperor Francis Joseph's Fiord. This was found to extend deep into the interior of the land, continually opening into new arms, and widening in places until it was traced out for over one-third of the estimated breadth of Greenland, and without any indication of coming to an end. Indeed, in a south-westerly direction it opened out into what looked like a great basin into which the fiord itself emptied. The circumstance also that the saltness of the fiords is generally greatly diminished by the fresh-water streams pouring into them when they are simply *cul-de-sacs*, and the fact that the great Greenland fiord, notwithstanding the enormous addition of fresh water, retained all its saltness, pointed to a maritime communication with the opposite side of the country. Time was not allowed to the party to prosecute the exploration of this supposed strait; but it is believed, as stated, that it finds its opposite opening in Baffin's Bay. Another still more potent argument in favour of the assumption that Greenland is a congeries of islands, and not a continent, was found in the apparent absence of great longitudinal valleys, such as usually characterise continents, these being entirely wanting in the north-eastern part of Greenland.

WE understand that the collection of books belonging to the late A. H. Haliday, A.M., has been left by his will, dated in 1847, to the Royal Irish Academy. This collection is very rich in rare entomological tracts, and it is expected that a catalogue of it will be formed under the directions of the librarian of the Academy. Any duplicates of works at present in the library of the Academy are to go to the library of the Natural History Society of Belfast. The entomological collection of Mr. Haliday was bequeathed to the Museum of Trinity College, Dublin. This collection chiefly consists of British Diptera and Hymenoptera, and contains the type specimens of the many classical monographs and papers of Mr. Haliday. It also contains the results of some years' collecting in Italy, and especially the insects, many of them of great interest, taken during a tour in Sicily in 1868 by Mr. Haliday and Professor E. P. Wright. Unfortunately the collection is still in store or collecting boxes, and is for the most part unnamed, the localities of the European insects, which, however, form far the smallest portion of the collection, being indicated only by dates. We hope soon to be able to report what steps will be taken to have this collection named and arranged, knowing well that the authorities at Trinity College, Dublin, will not be slothful in this matter.

A COMMITTEE has been raised for the purpose of collecting subscriptions to present Mr. John Banting Rogers with a testimonial, as a mark of the high appreciation in which the shipping community of this country hold his untiring labours in the introduction of his valuable invention for life-saving purpose.

A CORRESPONDENT calls our attention to a state of things in the village of Woking which appears to require the notice of the Government inspector. He states that the drainage from the convict prison at Woking and from the gas-works is allowed to flow into an open meadow, which has become perfectly saturated with it. Fever has been prevalent in the neighbourhood for the last two years, and small-pox is now added. At the neighbouring village of Horsell a school of 200 children has been closed in consequence. As usual, it seems impossible to fix on anyone the responsibility for abating the nuisance.

CAPTAIN C. F. HALL is busily engaged in fitting out his vessel for his cruise next summer, and will be amply provided with everything necessary for his comfort and the success of his enterprise. It is understood that Dr. David Walker, the well-known companion of Sir Leopold M'Clintock during his pedition in the *Fox* in search of Sir John Franklin, will acmpany Captain Hall in charge of the scientific department.

DR. A. W. EICHLER, the Editor of Martius's "Flora Brasiliensis," has been appointed Professor of Botany and Director of the Botanic Garden at Graz in Austria. No change will be necessary in the editing of the magnificent work under Prof. Eichler's charge.

THE region bordering upon the Black Sea has long been known to be full of antiquarian treasures of the highest interest, as evinced by the superb reports published from time to time at the expense of the Russian Government. A late exploration of the peninsula of Toman, situated between the Black Sea and the Sea of Azov, in continuation of previous researches, has brought to light many striking objects, particularly of those belonging to a past period of Greek art, and consisting of gold ornaments, sarcophagi, terra cotta statuettes, &c.

IN the Intercolonial Exhibition, held last year in Sydney, New South Wales, much interest and curiosity were felt in the specimens of wine exhibited. The report of the jury on the Victorian produce was highly satisfactory, more especially with regard to those wines retailed in Melbourne at 2*d*. and 4*d*. per tumbler. These wines are said to compare more than favourably with the cheap wines in general consumption in the wine countries of Europe, and promise ere long to supplant the use of beer and spirits in the classes most accustomed to use and abuse those beverages. For experience has long proved that men will drink wine in hot and dry climates in preference to all other beverages if they can get it abundantly, cheap, and good in its kind. The jury say that the cheap and wholesome wines sold in Melbourne at the above prices all over the city, and even a better class of wine retailed at 1*s*. per quart bottle, are the outward evidences of the hold which pure wine is taking on the masses in Victoria.

IT would appear from a communication in *Le Journal de Quebec* that the sea is steadily swallowing up the land at St. Thomas, and possibly other points on the lower St. Lawrence, a correspondent of the *Engineer* asserting that at low tide, some thirty years ago, he saw the ruins of the third church built in that locality within the space of two hundred years, and that since the battues, or banks covered by the tide, have advanced from one to two leagues into the interior.

MEAT-PRESERVING appears to be getting a profitable branch of trade in all countries where stock abounds or pasture exists. A new company with a capital of 50,000*l*., under the title of the "Victoria Two-fold Bay, and London Meat-preserving Company" has been started in Melbourne. The meat is to be preserved by a process of cooking *in vacuo* by which air and moisture is drawn from the inside of the tins during the cooking.

THE Monthly Notices of Papers and Proceedings of the Royal Society of Tasmania for March, April, and June, 1870, contain several valuable articles, including Contributions to the Phytography of Tasmania, by Dr. Ferd. von Müller; and some additional Observations on more recent changes which have taken place in the star η Argus and its surrounding nebula (with diagrams), by Mr. F. Abbott.

THE great booksellers like Hachette and Co. have been surprised to learn that their branch offices in occupied districts had transacted an immense amount of business. The reason is singular enough, and worthy to be noticed. The Prussian soldiers are learning the French language, and are purchasing an immense number of books. There is a new market opened for French authors, an unforeseen consequence of bloody defeats in the field.

AT one of the sittings of the French Academy, Dr. Felix Rochard proposed to establish on the Seine floating ambulances for the wounded as being probably more free than common hospitals from miasmatic influence. The proposition was warmly supported by Baron Larey, the great practising surgeon.